DOCUMENT RESUME

ED 114 049 IR 002 668

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TITLE Influence of Student Expectation and Student Sex on Predicting Academic Success.
PUB DATE 75
NOTE 17p.

EDRS PRICE MF-$0.76 HC-$1.58 Plus Postage
DESCRIPTORS *Academic Achievement; Attitude Tests; Audiovisual Instruction; College Students; *Expectation; Females; Higher Education; Independent Study; *Predictive Validity; *Sex Differences; *Student Attitudes

ABSTRACT

Predicting student success in various academic situations has traditionally been via the use of cognitive pre-tests, or other non-attitudinal measures. A study grouped students, (approximately 75 percent female, primarily college sophomores enrolled in a semester-length audiovisual course), according to individual pro-instructional expectancy levels (low, average, high). Instructional formats used were: (1) self-instruction manual with supplementary, non-required large group sessions, (2) self-instruction manual with coordinated small group sessions, (3) self-instruction manual alone. Data obtained from an average of 159 students enrolled in 3 consecutive semesters indicated that high expectancy students were most successful, and low expectancy students were least successful. Female students were relatively more successful than males in the three instructional formats tested. (NR)

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ED114049

# INFLUENCE OF STUDENT EXPECTATION AND STUDENT SEX ON PREDICTING ACADEMIC SUCCESS

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IR 008 668

# INFLUENCE OF STUDENT EXPECTATION AND STUDENT SEX ON PREDICTING ACADEMIC SUCCESS

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## Abstract

Predicting student success in various academic situations has traditionally been via the use of cognitive pre-tests, or other non-attitudinal measures. This study grouped students according to pre-instructional expectancy levels (low, average, high) for data analysis purposes. It was hypothesized that students with high expectations would be more academically successful than students would with lower expectations. It was also hypothesized that females would be relatively more successful in this audiovisual fundamentals course than males. Both hypotheses were supported by the data. High expectancy students were most successful, and low expectancy students were least successful in three different tests of this hypothesis. Also, female students were relatively more successful than males in the three instructional formats tested.

# INFLUENCE OF STUDENT EXPECTATION AND STUDENT SEX ON PREDICTING ACADEMIC SUCCESS

Academic success is generally considered to be a function of cognitive ability and motivation. However, expectancy theory suggests that an individual's behavior is a function of the degree to which that behavior is instrumental for the attainment of some outcome, and the eventual evaluation of that outcome (6). This theory has been used with some success to predict effort and performance in college students (7). The following investigation was an attempt to determine if student expectations are indicators of academic success in an audiovisual fundamentals course. Because audiovisual equipment operation aptitudes have traditionally been regarded as male skills, the influence of one's sex on academic success in this type of learning situation was also analyzed.

Review of the literature suggests that little has been done with respect to predicting academic success by using a student's course expectations. Todd, Terrell, and Frank (11) report that students who believe that their endeavors will lead to academic success are more likely to be normal achievers than

under achievers. Battle (2) found that persistence on academic tasks was related positively to expectancy of successful accomplishment (ie. She found a highly significant correlation between expected grade in mathematics and time spent working on problems). Mitchell and Nebeker's study (7) supports expectancy theory predictions concerning student effort and performance. They report that student effort is based on three related factors: a) the degree to which the person sees the effort as leading to good performance, b) the degree to which good performance is instrumental to the attainment of outcomes, and c) the evaluation of those outcomes. Volker and Simonson (12) report a highly significant correlation between a workshop participant's attitude toward the workshop and the participant's performance on final cognitive measures. However, the unanimity of these reported results is blunted somewhat by Stanford (9) who found that in a computer-assisted-instruction task performance study, the hypothesis that students with high expectancy would perform better was not supported by the data.

The relationship between one's sex and academic success has been scrutinized by numerous researchers. It has generally been found that girls are superior to boys in academic achievement in elementary grades (1, 5, 10). In secondary school grades, boys tend to

be more successful (5, 10), and in college, girls make better grades than boys (3, 5). As early as 1930, Peterson provided evidence that males are more successful at mechanical skills than females (8). Conventionally, males have been associated with success in audiovisual skills. However, studies using cognitive measures to determine the learning of audiovisual equipment operation and materials production sequences, as they relate to sex differences, are not found in the author's search of the sex difference literature.

This study was designed to investigate variations in academic success between groups of students with low, medium, and high pre-course expectations. In other words, students with low expectations, average expectations, and high expectations were identified and grouped together for data analysis purposes. Also, achievement differences between males and females were analyzed. The following hypotheses were tested:

$H_1$: student pre-course expectations are directly related to change in student class rank from pre-test to post-test.

$H_2$: females will change upward in class rank from pre-test to post-test to a greater extent than males.

METHOD: Three instructional formats for teaching an introductory audiovisual fundamentals course were used to provide three tests of these hypotheses. Each format covered the same content; only the method of presentation varied. The formats were taught during consecutive semesters at a large, midwestern university. The experimental sample was comprised of the entire enrollment of the semester-length audiovisual fundamentals course which was a requirement for teacher certification for the majority of the students. Subjects (Ss) were primarily college sophomores, with small numbers of juniors, seniors, and graduate students. Approximately seventy-five percent of the Ss were female, a typical pattern for this course. Briefly, the instructional formats were:

Format 1: Basic instruction in equipment operation and production of materials provided by a self-instruction manual with supplementary, non-required large group sessions.

Format 2: Basic instruction in equipment operation and production of materials provided by a self-instruction manual with coordinated small group sessions over the same procedures covered in the manual.

Format 3: Basic instruction in equipment operation and production of materials provided by a self-instruction manual with no large or small group sessions other than for administrative and evaluative purposes.

It should be noted then that there was no significant difference between instructional formats for the rank change (dependent) variable defined below.

In each format Ss were asked to indicate their expectations for the course by marking on a five-point Likert-type scale (very low to very high). This measurement was made during the first class session, after Ss were made aware of course structure and objectives. For hypothesis testing purposes Ss were assigned to one of three expectancy levels; low, medium, and high, according to their responses on the Likert-type scale. During the second class session Ss were given a multiple-choice pre-test (reliability = .85) covering the content of the course. Ss were assigned a percentile rank in class on the basis of pre-test scores. At the end of the semester, each S was given the same form of the multiple choice test, and again assigned a percentile rank in class on the basis of post-test score. The dependent variable, rank change from pre-test to post-test, was obtained by subtracting the S's

pre-test rank from the post-test rank and adding one hundred (to eliminate negative numbers). This variable, defined as rank change, was used to test the proposed hypotheses. (Rank change is used to minimize the influence of a S's pre-knowledge. Also, because measures used were locally developed and not standardized, although they were thoroughly piloted, it was determined that the relation of a S to his peers (ie. class rank) was an excellent measure of relative academic success. In this study, academic success was defined as a large upward change in a S's rank in class. Problems are obvious when measuring change for the extreme rank Ss, but these extraneous factors, such as the regression effect, would seem to be a conservative influence on the statistical analysis of the data, and seem to minimally affect the result.) An analysis of variance is used to test rank change differences between expectancy levels, and t-tests are used for measuring rank change differences between sexes.

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INSERT TABLE 1 ABOUT HERE

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TABLE 1

Descriptive Statistics and Analysis

of Variance for Expectancy Levels

| Instructional Format | | Pre-Course Expectation Levels | | | | |
|---|---|---|---|---|---|---|
| | | Low | Medium | High | F | p< |
| 1. | $\bar{X}$ | 87.36 | 103.74 | 110.46 | 4.3125 | .02 |
| | SD | 34.21 | 36.63 | 28.53 | | |
| | N | 33 | 71 | 39 | (2,140) | |
| 2. | $\bar{X}$ | 90.90 | 103.05 | 107.54 | 1.882 | .16 |
| | SD | 35.28 | 37.44 | 45.60 | | |
| | N | 40 | 106 | 22 | (2,165) | |
| 3. | $\bar{X}$ | 91.63 | 102.81 | 113.20 | 3.3734 | .04 |
| | SD | 34.85 | 35.46 | 37.95 | | |
| | N | 36 | 93 | 39 | (2,165) | |

RESULTS: The data supports the first hypothesis (Table 1). In all formats of instruction the means of the rank change scores show a linear progression from low to high for Ss expectancy levels.

Format 1: For Format 1, the expectancy hypothesis is supported ($F_{2,140}=4.3125$, $p<.02$). T-tests for expectancy levels in Format 1 show the differences between low and high expectancy groups and low and average expectancy groups are significant ($t_{low,\ hi}=2.4985$, $p<.01$; $t_{low,avg.}=2.1237$, $p<.05$).

Format 2: For Format 2, data trends show the means of the expectancy groupings support the first hypothesis. The difference between the means of the low expectancy group and the average expectancy group is significant ($t_{low,avg.}=1.7649$, $p<.05$).

Format 3: The data for Format 3 also supports the expectancy hypothesis ($F_{2,165}=3.3734$, $p<.04$). The expectancy group means are all significantly different from one another ($t_{low,hi}=2.5257$, $p<.01$; $t_{low,avg.}=1.604$, $p<.05$; $t_{avg,hi}=1.8977$, $p<.05$).

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INSERT TABLE 2 ABOUT HERE

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TABLE 2

Descriptive Statistics and T-tests

for Sex Differences

| Instructional Format | | SEX | | | |
|---|---|---|---|---|---|
| | | Male | Female | t | p< |
| 1. | $\bar{X}$ | 95.89 | 102.11 | .3036 | NS |
| | SD | 38.69 | 33.96 | | |
| | N | 29 | 114 | | |
| 2. | $\bar{X}$ | 94.75 | 102.16 | .9801 | NS |
| | SD | 40.47 | 37.77 | | |
| | N | 32 | 136 | | |
| 3. | $\bar{X}$ | 86.65 | 105.40 | 2.3123 | .01 |
| | SD | 38.31 | 35.59 | | |
| | N | 23 | 145 | | |

Results on measures of the differences between sexes are less clear. The directionality of the means of scores for all three formats support the second hypothesis that females will change upward in class rank to a greater extent than males; the mean of rank change scores for males is lower, in all cases, than the mean of rank change scores for females. However, only the difference between males and females in the third instructional format is statistically significant (Table 2).

DISCUSSION: The data from each of the three instructional formats tested supports the hypothesis that a student's pre-course expectations are directly related to change in class rank from pre-test to post-test. Students who initially state that they have low expectations about the course, when compared to other students, tend to drop in class rank from pre-test to post-test. High initial expectation is an indication of student improvement in class rank. Average expectation students remain about the same in class rank from pre-test to post-test. Two of the three instructional formats tested provide statistically significant evidence to support the first hypothesis. The other instructional format shows trends supporting the hypothesis. Thus, the findings of Mitchell and Nebeker (7)

demonstrating that expectancy theory can be used to predict academic performance are supported. Analysis of results of this study and the study of Mitchell and Nebeker leads the investigators to speculate that expectations are predictors of performance in various instructional formats of a audiovisual fundamentals course because: a) the class is required for most students so the range of initial expectations is relatively wide, b) grades for the majority of the students in the course are usually A or B so the external motivation of the grade is minimized, and c) a production/operation course requires considerable "hands-on" effort by the student, so students with high motivation could be expected to put forth more effort and consequently would be expected to better grasp basic concepts related to audiovisual skills. These three factors seem to work positively on students with high course expectations encouraging them to work on the course more than less motivated peers. Thus, students with high course expectations are more likely to grasp the basic course content and this understanding becomes apparent on the post-test in the form of higher raw scores and higher class rank.

Sex differences for the rank change variable were also found. Female students change in class rank in a positive direction from pre-test to post-test. Male

students' means of rank in class change were lower than the means of the female students in all instructional formats. This trend is statistically significant when no supplementary group instruction is provided (Format 3). Sex difference results prompt interesting speculation. Because audiovisual operation and production skills are in actuality quite simple and involve little brute strength or manual dexterity, the physical differences between the sexes should not come into play. While female students do score slightly lower on the pre-test (not significantly), one might speculate that female interest and motivation for learning basic techniques that may improve teaching effectiveness are the most significant factors in female Ss showing positive rank change.

Expectations about an instructional experience seem to play a vital role in predicting academic success. This study provides evidence that a student's expectation about an audiovisual fundamentals course is an indicator of success. This finding reopens the longstanding question of the impact attitude has on behavior. Does attitude predict behavior? If so, as this study seems to indicate, it seems logical to assume that a student with a low expectation for some kind of educational experience, might have this attitude modified early in the instructional experience in order

to increase the possibility of academic success. This attitude/behavior link has long troubled researchers in the social sciences, and would seem to be a crucial area for continued study.

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